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论文摘要汇编

ABSTRACTS

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THE GEOLOGIC EVOLUTION OF THE ANCIENT GRANITE-GREENSTONE TERRAIN OF CENTRAL-SOUTHERN BAHIA, BRAZIL.

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The granite-greenstone terrain of Central-southern Bahia belongs to the Sao Francisco Craton, and is a key area for the understanding of the Archean and Lower Proterozoic of South America. In addition it seems to be an area of great metallogenic potential.

The granitic-migmatitic-gneissic infrastructure is complex and is intimately associated with low to medium grade metasedimentary and metavolcanic sequences, such as the Brumado, Umburanas and Contendas-Mirante. In all of these sequences the metasedimentary succession largely predominates. Acid metavolcanics are significant in the sequence of Contendas, and ultrabasic rocks occur in several isolated units.

Early Archean granitoid rocks (Rb-Sr isochron ages older than 3.0 Ga.) were found in some regions, such as Mata verde-Boa Vista, Lagoa do Morro and Sete Voltas. Late Archean widespread granitization is assumed (about 2.7 Ga.) for most of the area, and the resulting terrain is taken to be the basement at least for the Contendas-Mirante sequence. The relationships to the Brumado and Umburanas metamorphic complexes are not clear, and these sequences may be truly Archean.

The Contendas-Mirante had been affected by a strong Lower Proterozoic deformation (about 2.0 Ga.) during which intrusions (like the Gameleira and Alianca granite) were formed, as well as large, domic structures, interpreted as mantled domed gneisses, such as those associated with the Boa Vista and Sete Voltas granitoid rocks. A Late Proterozoic to early Paleozoic thermal event affected the southwestern part of the region, as revealed by K-Ar ages on mica, of about 0.5-0.7 Ga.

TECTONIC EVOLUTION OF THE KEWEENAWAN RIFT (PROTERO-ZOIC) OF NORTH AMERICA

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The Keweenawan province defines an intraplate rift that extends from Kansas northeastward to Lake Superior where it trends eastward and then southeastward into lower Michigan. Keweenawan rocks crop out only near Lake Superior, but they can be traced in the subsurface by pronounced gravity and magnetic anomalies and scattered deep boreholes. The belt of Keweenawan rocks is about 2000 km long, is typically about 150 km wide, and generally lies discordant to the structural grain in older Precambrian rocks. The age limits are poorly known, but most Keweenawan rocks fall in the 1300-1000 m.y. range; some igneous rocks may be as young as 900 m.y., and some sedimentary rocks perhaps even younger.

The Keweenawan Supergroup consists of a lower clastic sedimentary unit, a middle volcanic unit, and an upper clastic sedimentary unit. The basal conglomerate-quzite unit is about 100 m thick and locally may be as old as 1300 m.y. The volcanic unit formed in eight or more separate basins, is more than 10 km thick in places, and consists mainly of tholeiitic flows but with some intermediate rocks and rhyolites. The upper clastic redbed unit is at least 8 km thick, and it is divided into a lower immature sequence (Oronto Group) and an upper mature sequence (Bayfield Group). Rocks as young as Oronto Group are cut by intrusive alkalic complexes, tholeiitic dikes and sills, and large layered bodies that consist of peridotite, troctolite, gabbro, anorthosite, and granophyre.

The Keweenawan belt comprises a crustal syncline; near western Lake Superior it is markedly asymmetric--gentle on the northwest, steep on the southeast. Several major reverse faults, along with some large folds, trend parallel to the major syncline. Cross faults are numerous but usually small in displacement. Along much of the belt the axis of the major syncline lies within an elevated crustal block, the axial horst, which consists of volcanic rocks and which is flanked by Keweenawan sedimentary basins.

The tectonic evolution of the province can be divided into three stages. Crustal extension (about north-south?) began approximately 1300 m.y.ago, causing subsidence of some 15 km that continued until about 1100 m.y. ago and accumulation of rocks through the Oronto Group.A postulated mantle plume beneath Lake Superior might explain the two arms of the rift, but a third arm is difficult to locate. The second stage involved a northwest-southeast crustal compression, possibly related to the Grenville orogeny to the southeast, and it steepened the southeast limb of the major syncline to the southwest of central Lake Superior. There may have been strike-slip displacement along the southeast arm of the rife during this stage, which occurred sometime after about 1100 m.y. ago. In the third stage the axial horst and flanking basins formed, and this process continued into Phanerozoic time. The origin of the horst is not understood, but its presence is in striking contrast to the graben characteristic of other extensional rift zones.

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